Procrastination, Present-Biased Preferences and Financial Behaviors

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University of Texas Austin

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Overview

- We use an empirical measure of decision-making delays to identify procrastinators
  - Those who wait until the last day of enrollment period to make health care plan election

- Relative to non-procrastinators, we show that procrastinators:
  - Take longer to sign-up for 401(k)
  - Contribute less
  - Are more likely to stick with default portfolio
  - Are less likely to annuitize (more like to choose lump sum)
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We discuss why procrastination deriving from present-biased preferences is the most likely explanation for all our empirical results.

Specifically, we address why results are not due to:

- Optimal delay
- Just being busy, or disorganized
- Rational inattention
- Mere liquidity constraints
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Why Procrastination?

From Psychology:
- "Willingly deferring something even though you expect the delay to make you worse off" (Steel in the New Yorker)
- It is a dimension of conscientiousness, which is one of the "Big Five" personality traits (Steel, 2007 in Psychological Bulletin)

From Economics:
- Procrastination arises from present-biased preferences (PBP)
  - "Procrastination occurs when present costs are unduly salient in comparison with future costs, leading individuals to postpone tasks until tomorrow without foreseeing that when tomorrow comes, the required action will be delayed again" George Akerlof (Ely Lecture, 1991)
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Why Retirement Planning?

- DC system provides more autonomy, and also more room for mistakes (Benartzi and Thaler, 2007)
- We still do not fully understand why there is such a large dispersion of wealth at retirement (Poterba, Venti and Wise, 2013)
- It has been suggested as one reason that default options may exert such a power influence on behavior (Beshears et al., 2009)
- Intuitively, procrastination is a likely culprit because:
  - "the further away an event is temporally" (Steel, 2007)
  - "the more important the decision is" (O'Donoghue and Rabin, 1999b)
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Outline

- Evidence
  - Measuring procrastination
  - Two main data sets (DC and DB plans)
  - Four behaviors

- Interpretation of the evidence
  - The case for present-biased preferences
  - Out of sample replication

- Implications
Measuring Procrastination

- We empirically define "procrastinators" as people who wait until the "last minute" to make their health care plan election
  - Firms have annual open enrollment windows (typically 30 days)
  - We classify as procrastinators employees waiting until the last day

- The advantages of our measure of procrastination:
  - Actual and consequential behavior (Levitt and List, 2008)
  - External validity: This approach can be easily implemented in many administrative data sets (we use three in this paper)

- The challenge of our measure is that we must establish:
  1. Results are due to procrastination rather than optimal delay
  2. Procrastination is due to present-biased preferences rather than rational inattention, being busy or disorganized, liquidity constraints
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First Data Set: DC (401k) Plans

- 27 plans from 23 firms, with roughly 155,000 participants hired from 2002 - 2008
  - Exact dates of hire, health plan election, 401(k) enrollment
  - Contribution rates and portfolios measured as of 1/1/09

- Limited number of covariates
  - Gender
  - Age
  - Tenure with firm
  - Plan indicators
  - Enrollment year indicators

- We do not observe plan features (e.g., auto-enrollment), but we have constructed an algorithm for identifying likely default firms:
  - We use modal sign-up date and QDIA funds
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I. Procrastinators Take *Longer* to Join  
(OLS Models)

<table>
<thead>
<tr>
<th>Regressor:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procr. First</td>
<td>50.603***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(12.704)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procr. Ever</td>
<td></td>
<td>61.100***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(10.845)</td>
<td></td>
</tr>
<tr>
<td>Procr. Always</td>
<td></td>
<td></td>
<td>63.437***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(22.568)</td>
</tr>
</tbody>
</table>

Dependent Variable:  
Days to Join (184.85)

Other controls:  
Yes  
Yes  
Yes

N  
151,820  
151,820  
151,820

Similar results using Cox Proportional Hazard Models  
We also control for female (+), hiring age (-), plan and year controls
II. Procrastinators Contribute Less

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Contribution as % of Pay (7.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Procr. First</td>
<td>-0.473**</td>
</tr>
<tr>
<td></td>
<td>(0.212)</td>
</tr>
<tr>
<td>Procr. Ever</td>
<td>-0.490**</td>
</tr>
<tr>
<td></td>
<td>(0.233)</td>
</tr>
<tr>
<td>Procr. Always</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Controls?</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>27,016</td>
</tr>
</tbody>
</table>

The effect in the entire sample period (2002-08) ranges from -0.10 to -0.19.

BUT – Prediction unclear with heterogeneity in whether offer auto-enrollment or not!
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<td>-0.490**</td>
</tr>
<tr>
<td></td>
<td>(0.233)</td>
</tr>
<tr>
<td>Procr. Always</td>
<td>-0.612*</td>
</tr>
<tr>
<td></td>
<td>(0.312)</td>
</tr>
<tr>
<td>Other Controls?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>27,016</td>
</tr>
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## II. Contribution Effect Concentrated in Plans *without* Automatic Enrollment

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Contribution as % of Pay (7.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plans with no default option</td>
</tr>
<tr>
<td>Sample:</td>
<td>(1) (2) (3)</td>
</tr>
<tr>
<td>Procr. First</td>
<td>-0.563** (0.256)</td>
</tr>
<tr>
<td>Procr. Ever</td>
<td>-0.577* (0.288)</td>
</tr>
<tr>
<td>Procr. Always</td>
<td>-0.763* (0.400)</td>
</tr>
<tr>
<td>Other Controls?</td>
<td>Yes Yes Yes</td>
</tr>
<tr>
<td>N</td>
<td>17,697 17,697 17,697</td>
</tr>
</tbody>
</table>
II. Contribution Effect Stronger for *Higher* Saving Rates: Quantile Regressions

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Contribution as % of Pay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25th</td>
</tr>
<tr>
<td>Percentile:</td>
<td>(1)</td>
</tr>
<tr>
<td>Procr. First</td>
<td>-0.237***</td>
</tr>
<tr>
<td></td>
<td>(0.053)</td>
</tr>
<tr>
<td>Procr. Ever</td>
<td>-0.223***</td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
</tr>
<tr>
<td>Procr. Always</td>
<td>-0.340***</td>
</tr>
<tr>
<td></td>
<td>(0.066)</td>
</tr>
<tr>
<td>Other Controls?</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>27,016</td>
</tr>
</tbody>
</table>
III. Portfolio Allocation

- Theory does not have a clear prediction about relation between procrastination and portfolio allocation (risk aversion)

- But, after the Pension Protection Act (PPA), firms with auto-enrollment use Qualified Default Investment Alternatives (QDIAs) as the default investment option
  - Lifecycle funds, target date retirement funds, and balanced funds
  - We test if procrastinators are more likely to stick with the default and use lifecycle funds after PPA

- We rely on a difference-in-difference methodology:
  - Regulations took effect in 2007, so we use 2008 as the ”after period”
  - Robustness checks using other dates in 2007
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III. Procrastinators Invest *More* in "QDIA" Funds Post-PPA

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<thead>
<tr>
<th>Dependent Variable:</th>
<th>Share in QDIA Fund (23.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample Period:</strong></td>
<td><strong>2002-2008</strong></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Procr. First</td>
<td>1.177* (0.674)</td>
</tr>
<tr>
<td>Procr. First x post PPA</td>
<td>10.572*** (2.079)</td>
</tr>
<tr>
<td>Procr. Ever</td>
<td>0.232 (0.698)</td>
</tr>
<tr>
<td>Procr. Ever x post PPA</td>
<td>11.917*** (2.981)</td>
</tr>
<tr>
<td>Procr. Always</td>
<td>1.717 (1.389)</td>
</tr>
<tr>
<td>Procr. Always x post PPA</td>
<td>10.881*** (2.833)</td>
</tr>
<tr>
<td>Post PPA</td>
<td>22.393** (8.377)</td>
</tr>
<tr>
<td></td>
<td>21.841** (8.180)</td>
</tr>
<tr>
<td></td>
<td>22.614** (8.438)</td>
</tr>
<tr>
<td>Other Controls?</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>149,258</td>
</tr>
</tbody>
</table>
Second Data Set: DB Plans

- 63 firms with DB plans that allow a lump-sum option and which also have health care plan election data
- Over 27,000 individuals who retired and made a LS versus annuity decision from 2002-2008
- Covariates:
  - Gender, age and tenure with the firm
  - Size of individual’s DB lump sum
  - Plan and year effects
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IV. Procrastinators are Less Likely to Annuitize

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<th>(3)</th>
</tr>
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<tbody>
<tr>
<td>Procr. First</td>
<td>-5.906***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.661)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procr. Ever</td>
<td></td>
<td>-3.818**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.452)</td>
<td></td>
</tr>
<tr>
<td>Procr. Always</td>
<td></td>
<td></td>
<td>-4.031</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(3.052)</td>
</tr>
</tbody>
</table>

Other controls? Yes Yes Yes

N 27,231 27,231 27,231

Regressions also control for female (+), age (-), value of DB (+), tenure (0), plan and year controls
IV. Annuitization and Framing

- Annuities are less attractive when presented in an investment (vs. consumption) frame
  - Brown et al. (2008); Benartzi, Thaler and Previtero (2011); and Beshears et al. (2014)

- Our Hypothesis: If present-biased preferences drive preference for lump-sum, then this preference should be even stronger when the lump-sum is made more salient

- Our ”Experiment”: Compare Cash Balance and DB plans
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IV. Effect of Procrastination is *Stronger* when Lum Sum is *More Salient*

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Pr(Annuity) (0.42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample:</td>
<td>Cash Balance Plans</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Procr. First</td>
<td>-6.451***</td>
</tr>
<tr>
<td>Procr. Ever</td>
<td>-5.004***</td>
</tr>
<tr>
<td>Procr. Always</td>
<td>-12.547***</td>
</tr>
<tr>
<td>Other Controls?</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>10,568</td>
</tr>
</tbody>
</table>

Regressions also control for female (+), age (+), DB size (+), tenure (0) plan and year controls.
Interpretation of the evidence

1. Is It Optimal Delay?
   - Optimal Delayers – those that submit on last day, but having had prior submissions – have opposite behaviors

2. Are Procrastinators Just Busy or Disorganized?
   - No obvious reason why busy individuals would save less or prefer a lump sum

3. Is It Rational Inattention?
   - Stylized calculation shows 10–15% reduction in accumulated retirement resources

4. Are We Just Capturing Liquidity Constraints?
   - Results are robust to controlling for financial education and liquidity constraints (zip code level data from FINRA Foundation)
   - Effects of procrastination are constant (or increase) across different income quartiles
   - Mediation analysis reveals that from 70 to 90% of the effect of procrastination is direct, and not mediated by income
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   - *Optimal Delayers* – those that submit on last day, but having had prior submissions – have opposite behaviors

2. Are Procrastinators Just Busy or Disorganized?
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- 2,678 new employees joining U of I system during c.y. 2010
  - *Plan Participation* is 1 if contribute to at least one of 403(b) or 457 by last pay period of 2010, 0 otherwise
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Procrastinators Are Less Likely to Sign Up for Supplemental Plan

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Dependent Variable: Plan Participation (0.08)</th>
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<tr>
<td></td>
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<tr>
<td>Procrastinator</td>
<td>-0.024**</td>
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<tr>
<td></td>
<td>(0.011)</td>
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<tr>
<td>Female</td>
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<td></td>
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<td>Age</td>
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<td></td>
<td>(0.001)</td>
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<tr>
<td>Faculty</td>
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<tr>
<td></td>
<td>(0.014)</td>
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<tr>
<td>Financial Literacy</td>
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<td></td>
<td>(0.029)</td>
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<tr>
<td>Constant</td>
<td>0.082***</td>
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<td>-0.053**</td>
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<tr>
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<td>(0.021)</td>
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</tbody>
</table>
Summary of Findings

**Procrastinators:**
- Are less likely to participate in supplemental savings plans
- Take longer to sign up when they do participate
- Contribute less
- Are more likely to stick with the default investment option after passage of PPA
- Are more likely to allocate 100% of their portfolio to the default investment option after PPA
- Are less likely to annuitize their DB at retirement
- More so, when lump sum is more salient

Present-biased preferences can jointly explain all of these results.
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  - There is no gap in saving rates in plans with automatic enrolment
  - Overcoming procrastination can increase income at retirement by 10–15%

- Retirement Income and Annuityization
  - Procrastinators are more likely to take the lump sum
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Thank you!